

E FIELDS

CONSERVATION

USDA Research Improves Water Problem In West

SEVENTEEN MINUTES is all it takes to turn a dry streambed into a torrent, with 20,000 cubic feet of water tearing by each second.

This is one of the problems—flash floods—being studied by its scientists, the U. S. Department of Agriculture has reported. Research conducted at Tucson, Ariz., by USDA experts points to several possible ways of recovering water normally lost in flash floods. Suggestions include: 1. small storage reservoirs, 2. storage of water underground, and 3. improved vegetation.

Small storage reservoirs located on the tributaries of larger streams could mean a "relatively high degree of water recovery," Robert V. Keppel and Joel E. Fletcher said. This is due to the prevalence of small local showers with large losses of runoff in normally dry streambeds. Thunderstorms near Tucson were usually less than one mile and one-half in diameter, they said, with most of the water falling from a cloud area about half this size.

Underground storage of water, where evaporation losses are the least, is being given increased study in long-range water planning for the West.

Runoff can be further reduced by changes in vegetation, the USDA scientists explained. Plants decrease surface "puddling" and can thus increase the rate of water infiltration into the soil, recharging underground water storage areas.

USDA studies indicate less than five percent of the rain running off southwestern rangelands ever reaches a point downstream where it can be put to use. With populations continuing to rise, the short water supply situation is becoming more acute.

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PHYSIOLOGY

Unborn Babies Create Own Sea Level Conditions

UNBORN BABIES that are carried by women that live in high altitudes create "sea level" conditions for themselves, a team of six doctors has discovered.

At high altitudes, oxygen, vitally needed by the unborn baby, is not as abundant in the air as it is closer to the lower levels of the earth. Therefore, the baby, to survive until time of delivery, creates a larger supply of oxygen for itself by enlarging its mother's placenta. This is the organ within the uterus that establishes a connection between the mother and baby by means of the umbilical cord which carries nourishment and oxygen between them.

An expedition, headed by Dr. Donald H. Barron of the Yale School of Medicine, went to Peru to study the problem of pregnant

mammals who have difficulty supplying oxygen to the unborn fetus.

They presumed that the problem would be automatically magnified at higher altitudes where oxygen becomes scarce.

At sea level, the greatest single cause of death among infants at or about the time of birth is fetal anoxia, an insufficient supply of oxygen.

The investigators learned through detailed laboratory experiments with pregnant sheep and llamas that a fetus in an atmosphere of rare oxygen is capable of enlarging the placenta to receive oxygen from his mother.

The researchers emphasized that their study was limited to the unborn fetus only and did not extend to a further study of the baby during the actual process of birth or after.

The scientists conducted their study at the Institute of Andean Biology in Morococha, 15,000 feet above sea level. In addition to Dr. Barron, Drs. James Metcalf of the Harvard Medical School, William Huckabee of Boston University Medical School, Andre Hellegers of Johns Hopkins Medical School, Harry Prystowsky of the University of Florida Medical School and Giacomo Meschia of Yale participated. Dr. Alberto Hurtado, director of the Institute and dean of the Medical School of the National University of San Marcos, Peru, assisted.

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ASTRONOMY

Supernova's Light Due To Radioactive Iron

THE LIGHT of a supernova, a star that suddenly blazes forth at more than a million times its previous level, may be due to iron, not the artificial element, californium-254.

Dr. Edward Anders of the University of Chicago's chemistry department and Enrico Fermi Institute for Nuclear Studies proposes the iron-group theory to account for the observed falling-off rate of a supernova's light. His theory disagrees with one proposed about three years ago by five astronomers.

They suggested that californium-254, made when supernovae explode, is responsible for the supernova's dwindling light. Californium-254 is heavier than uranium and, like uranium, spontaneously breaks up, half of any given amount disappearing in about 55 days. This same period of 55 days is observed in the decreasing light curves of supernovae.

Dr. Anders suggests the declining light is due to the breakup of iron-59, which takes 45 days for half of any amount to disappear. This picture, he says, can account for the build-up of both the light and heavy elements in about the same proportions as found in the solar system, unlike the theory of the five astronomers.

The synthesis of elements of the iron group in a supernova is a theory proposed by Dr. Fred Hoyle, now at Harvard College Observatory. Dr. Anders' theory is outlined in detail in the *Astrophysical Journal* (March).

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BIOLOGY

Extinct Sea Life Hunted by Scientists

TRILOBITES, crab-like creatures that inhabited the oceans 500,000,000 years ago and considered extinct in today's textbooks, are objects of an intense search that is getting under way by scientists of the Scripps Institution of Oceanography.

The scientists who will make the living fossil hunt are Robert H. Parker, a Scripps ecologist, and Dr. Henning Lemche, a zoologist from Denmark. They do not believe the trilobite is extinct and are planning to go out and look for the organism. They hope to bring living specimens back and breed little trilobites in a laboratory.

If they can find this living fossil, they may be able to push back the knowledge of how life got started on this earth by millions of years.

The Scripps scientists are optimistic about finding trilobites, based on the fact that ocean creatures called "neopilina," once believed extinct, were dredged up out of the Gulf of California. They believe if neopilina can be found, so can trilobites.

The wrong places may have been searched for living fossils in the past. Although some old, dead fossils have been shallow-water residents (found in ancient sediments that have turned to sandstone), neopilina and other fossils once thought extinct were found from 1,200 to 12,000 feet down on the continental slopes or underwater mountain sides. It is believed that they were crowded out of shallow water by other animals and found less competition on the deeper slopes.

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PHYSIOLOGY

Chemical Helps Preserve Frozen Living Tissues

A NEW METHOD for preserving frozen red blood cells, both human and cow, has been reported.

The chemical dimethyl sulphoxide promises more effective protection against the damaging freezing-thawing process than several other compounds, say J. E. Lovelock and M. W. H. Bishop of the National Institute for Medical Research, Mill Hill, London. Previously it had been found that glycerol and "other neutral solutes" prevented freezing damage to living cells.

The researchers found that dimethyl sulphoxide penetrates the red blood cell more quickly and less is needed for complete protection against freezing. For example, they pointed out, two hours with glycerol before freezing gave poor protection to both cow and human red blood cells. However, only 30 seconds with dimethyl sulphoxide gave complete protection.

The compound should be useful for preserving living tissues that are not now protected by glycerol treatment, the researchers conclude in *Nature* (May 16).

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